

# A Theoretical Study on Green Concrete Construction

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## ABSTRACT

Concrete which are taken from the demolished structures or from concrete waste which are considered to be eco friendly and using it for the purpose of another building construction is called as green concrete construction. This helps to make the future construction eco friendly and also reduce the emission of CO<sub>2</sub>. Now-a-days global warming is the major drawback of whole world which is directly or indirectly caused by the civil engineering field. The world consumes concrete more next to water. So it is the duty of every civil engineer to go along the disadvantages of green house gas emission and to reduce their effects in environment. This can be sought by using the eco friendly materials and also the eco friendly waste concrete available in earth. This journal paper would provide the ideas of green construction and also helps to induce the engineers choice of construction.

**KEYWORDS:** Green concrete, eco friendly, CO<sub>2</sub> reduction, sustainability

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## INTRODUCTION

Concrete which is made from concrete wastes that are eco-friendly are called as "Green concrete". Green Concrete is a term given to a concrete that has had extra steps taken in the mix design and placement to insure a sustainable structure and a long life cycle with a low maintenance surface. e.g. Energy saving, CO<sub>2</sub> emissions.

Green concrete is the revolutionary topic which was first in Denmark by the engineer Dr. WG in the year 1998. The introduction of green concrete technology is to reduce the global warming by less emission of carbon dioxide. CO<sub>2</sub> emissions shall be reduced by at least 30 %. At least 20 % of the concrete shall be residual products used as aggregate. Use of concrete industries own residual products. Use of new types of residual products, previously land filled or disposed of in other ways. CO<sub>2</sub>-neutral, waste-derived fuels shall substitute fossil fuels in the cement production by at least 10%.

## REASON FOR CHOOSING THE GREEN CONCRETE BUILDING CONCEPTS:

Conventionally, the performance of building projects is measured based on cost, time, and quality. Recently, because of the climate change, global warming and lack of resources, the environmental issue has become a major concern in the construction industry. Sustainable projects take economic, environmental, and social factors into consideration. However, the environmental factor becomes more important among the three factors of sustainability. This is the reason behind the construction of green concrete buildings.

## WASTE CONCRETE MATERIALS USED FOR CONSTRUCTION:

- Slag
- Power plant wastes
- Recycled concrete
- Mining and quarrying waste
- Waste glass
- Incinerator residue
- Red mud
- Burnt clay
- Saw dust
- Combustor ash
- Foundry sand

## ECO FRIENDLY MATERIALS IN CONSTRUCTION:

- Plastic bricks
- Bamboo
- Bagasse particle board
- Rice husk ash concrete
- ACC blocks
- Porotherm bricks
- TMT Bars
- Fly ash bricks

## ADVANTAGES IN CONSTRUCTION OF GREEN CONSTRUCTION

Reduction of the concrete industry's CO<sub>2</sub>-emission by 30 %. Increased concrete industry's use of waste products by 20%. NO environmental pollution and sustainable development will be improved. Green concrete requires less maintenance and repairs. Green concrete having better workability than conventional concrete. Good thermal resistant and fire

resistant. Compressive strength behaviour of concrete with water cement ratio is similar to conventional concrete. Flexural strength of green concrete is almost equal to that of conventional concrete.

### HOW THE GREEN STRUCTURES TAKES IT TO THE SUSTAINABLE ENVIRONMENT:

Green Building, also known as green construction or sustainable building, is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation
- A similar concept is natural building, which is usually on a smaller scale and tends to focus on the use of natural materials that are available locally. Other related topics include sustainable design and green architecture.

### IT MAKES THE ENVIRONMENT GOALS POSSIBLE

The concept of sustainable development can be traced to the energy (especially fossil oil) crisis and the environment pollution concern in the 1970s. The green building movement in the U.S. originated from the need and desire for more energy efficient and environmentally friendly construction practices. There are a number of motives to building green, including environmental, economic, and social benefits. However, modern sustainability initiatives call for an integrated and synergistic design to both new construction and in the retrofitting of an existing structure. Also known as sustainable design, this approach integrates the building life-cycle with each green practice employed with a design-purpose to create a synergy amongst the practices used.

Green building brings together a vast array of practices and techniques to reduce and ultimately eliminate the impacts of buildings on the environment and human health. It often emphasizes taking advantage of renewable resources, e.g., using sunlight through passive solar, active solar, and photovoltaic techniques and using plants and trees through green roofs, rain gardens, and for reduction of rainwater run-off. Many other techniques, such as using packed gravel or permeable concrete instead of conventional concrete or asphalt to enhance replenishment of ground water, are used as well.

While the practices, or technologies, employed in green building are constantly evolving and may differ from region to region, there are fundamental principles that persist from which the method is derived: Siting and Structure Design

Efficiency, Energy Efficiency, Water Efficiency, Materials Efficiency, Indoor Environmental Quality Enhancement, Operations and Maintenance Optimization, and Waste and Toxics Reduction. The essence of green building is an optimization of one or more of these principles. Also, with the proper synergistic design, individual green building technologies may work together to produce a greater cumulative effect.

On the aesthetic side of green architecture or sustainable design is the philosophy of designing a building that is in harmony with the natural features and resources surrounding the site. There are several key steps in designing sustainable buildings: specify 'green' building materials from local sources, reduce loads, optimize systems, and generate on-site renewable energy.

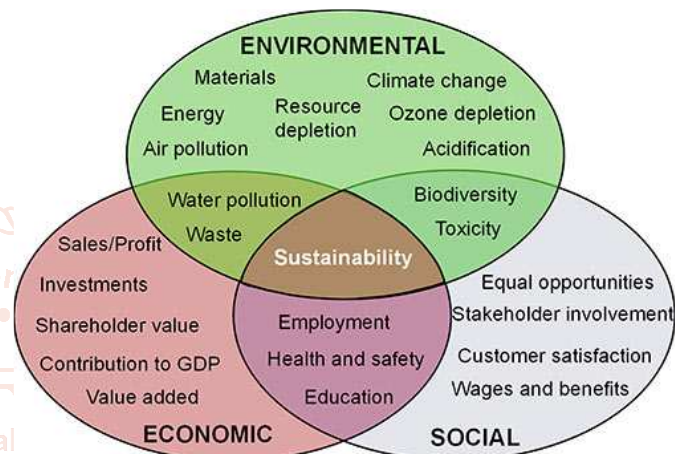


Figure:1 sustainability factors

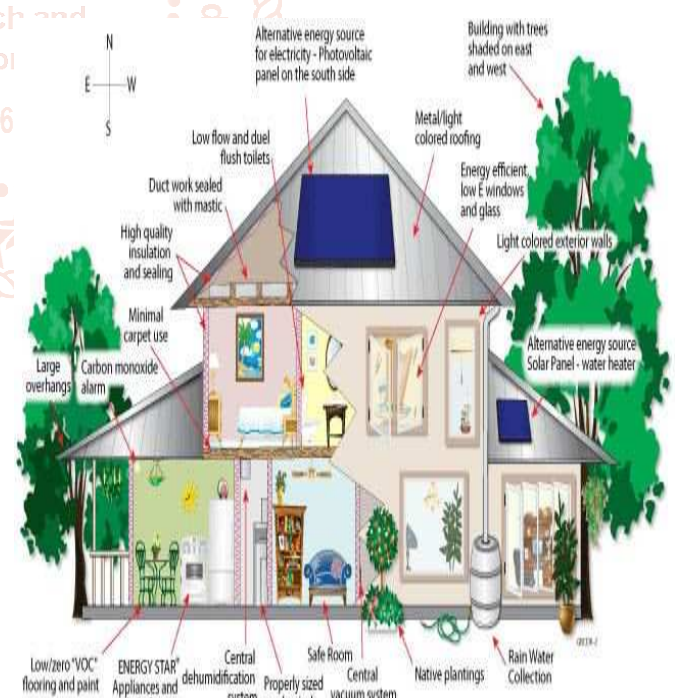


Figure 2: building with green materials

### LIMITATIONS:

By using stainless steel, cost of reinforcement increases. Structures constructed with green concrete have comparatively less life than structures with conventional concrete. Split tension of green concrete is less than that of the conventional concrete.

## CONCLUSION:

Thus huge number of advantages has been placed in the construction of green concrete buildings especially the CO<sub>2</sub> emission has been reduced to 30% compared to the traditional concrete. And also the indoor air quality has been risen. It also improves the reduction in usage of energy, economical construction along with the sustainability. Hence it is a most recommended method of future construction buildings.

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